APPLICATION

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TITLE: ELECTRONIC COMMERCE USING PERSONAL
PREFERENCES

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ELECTRONIC COMMERCE USING PERSONAL PREFERENCES

Background

This invention relates to electronic commerce.

Computers are often used to store and maintain databases.
Databases can be of many types. One type of database stores
data in tabular form, e.g., relational databases. Other
databases include hierarchical databases and flat-file
structures that are similar to a table or a spreadsheet.
Another type of database is the so-called object-oriented
database.

The world-wide-web stores information in resources that
can be found through an address such as a uniform resource
locator (URL). Wireless devices are also known for use with
the Internet. Data exchange with wired of wireless devices
involves transmission of data via E-mail address or web pages.
Such data transmission can be secure, but data regarding
personal preferences can be obtained by host systems whether
or not intended.

Summary

According to an aspect of the present invention, a method
of notifying users of electronic services includes dynamically
matching custom information stored on distributed databases
with information that users hold in a user device on topics of
interest.

According to an additional aspect of the present
invention, a client device includes a computing device that
executes computer instructions and a database of personal
interests. The client device also includes a process that
either offers and/or requests services and information based
on personal interests of a user. The process includes a

process to wrap content with control information designating ownership of the content, the time span the content is valid, and rules specifying how content is to be matched.

According to an additional aspect of the present invention, a system to enable a person to interact in both a physical world and an electronic world includes a server that delivers news and information. The electronic world has virtual stores and enables online interactions through wired and wireless networks. The system also includes a client user device. The client user device includes a database of personal interests and a process that either offers and/or requests services and information based on the personal interests. The process includes a process to wrap content with control information designating ownership of the content, the time span the content is valid, and rules specifying how content is to be matched.

According to an additional aspect of the present invention, a server system includes a matching process that matches information from a client with information from other hosts that are also sending information to the server. The matching process includes matching wrapper information from a received capsule, the wrapper information including information that determines the use of the information content of the capsule.

According to an additional aspect of the present invention, a method for conducting commerce where information and services are provided to customers includes selectively activating shareable database capsules from information contained in personalized, shared databases. The method also includes distributing the shareable capsules over a network communications medium as matchable capsules, matching the matchable capsules with other complementary matchable capsules

and making the existence and results of a match of a pair of matchable capsules visible only if matched capsules have compatible visibility settings.

According to an additional aspect of the present invention, a method for maintaining privacy in exchange of data includes attaching a directional visibility flag to a request or offer for information or services and distributing the request or offer. The method also includes matching the visibility setting of a request or offer to complementary items in a complementary one of the request or offer. The method also includes processing the match in accordance with the visibility specification to prevent any information about the existence or results of the match from being communicated to contrary to the visibility flags.

According to an additional aspect of the present invention, a computer readable medium stores a data structure. The data structure represents a shareable database capsule including a content field that contains offers and requests for information and services and a transmittal information field that contains information to control the distribution, matching and privacy of the sharing of the database capsule.

According to an additional aspect of the present invention, a system includes a server that includes a matching process that matches information from a client with information from other hosts that are also sending information to the server. The matching process includes a matching process to match wrapper information from a received capsule, where the wrapper information includes information that determines the use of the information content of the capsule. The system also includes a client user device to interact with the server device. The client user device includes a database of personal interests and a process that either offers and/or

requests services and information based on the personal interests. The process includes a process to wrap content with control information designating ownership of the content, the time span the content is valid, and rules specifying how content is to be matched.

One or more aspects of the invention may have one or more of the following advantages.

The invention connects people and electronic services by dynamically matching custom information stored on distributed databases. Users hold information on topics of interest. The information can be accumulated and organized over time, produced or collected from various sources and carried on a fixed computing device, or portable computing device like a personal digital assistant (PDA) or cell phone. People can specify interests in hobbies, dining preferences, research topics, news, social and cultural interests, personal information like clothing sizes, or activities to participate in. Companies and other organizations can supply information on products and services, useful facts, and other information in response to requests for such information or as a general broadcast of information.

The basic content of the information is wrapped with information about its owner, the time span it will be valid, its audience, what pieces of information are to be matched, what information is to be filled in, and what other actions are to occur if a match occurs. These data capsules can be expressed as small fragments of information used to locate and obtain further information.

This system is suited, in particular, to mobile computing and communications situations because browsing, i.e., interacting with a device in a changing mobile environment is highly limited. Instead of browsing for information e.g.,

browsing the web, or receiving preset data channels, users (mobile and fixed) specify requests or offers for information and services by sharing pieces of personalized databases. The information shared in the course of interaction is shielded via privacy features.

The invention enables users to control publication and dissemination of personal, e.g., profile information, thus preventing hosts from knowing preferences ahead of time and channeling information to the user. The invention enables users to manage their own databases of information and specify or focus information that is of interest. A user's temporal interest can be related to a user's current physical location. Information is sent to a matching process that tries to match the information with information that a host provides. The matching process can be an intermediary service or a peer-to-peer process. An intermediary matching server or process can be controlled such that the host may never see private information even though its been analyzed by the intermediary.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an arrangement to interface a virtual world to a physical world.

FIG. 2 is a flow chart of an information sharing process.

FIG. 3 is a diagram depicting client device screens.

FIG. 4 is a block diagram depicting a data distribution scheme.

FIG. 5 is a block diagram of processing modules.

FIG. 6A is a diagram of a conceptual exchange capsule.

FIG. 6B is a diagram of an exchange data structure.

FIG. 6C is a diagram of the details of the exchange data structure.

FIGS. 7-12 are diagrams depicting details and examples of

the data structure of FIG. 6.

FIG. 13 is a diagram depicting client device screens for setting up capsule transmittal data.

FIG. 14A is a diagram depicting a plain text representation of an exemplary capsule implemented.

FIG. 14B is a diagram depicting a plain text representation of an exemplary capsule implemented in XML.

FIG. 15 is a flow chart of a match process.

FIGS. 16-18 are flowcharts depicting aspects of a matching process.

FIG. 19 is a flow chart depicting details of a visibility process.

FIG. 20 is a diagram of a privacy process.

DESCRIPTION

Referring to FIG. 1, an arrangement 10 to enable a person to interact in both a physical world 12 and an electronic (virtual) world 14 is shown. The physical world 12 contains stores, products, machines, other people, offices, etc., generally 12a. The electronic world 14 contains servers 15 that deliver news and information, and provide virtual stores and an online presence for the physical stores, products, machines, etc. The servers 15 also provide interactions with people, through wired and wireless networks.

A person occupies a location 17 in the physical world and interacts with the virtual world 14 through a computer, a cell phone or personal digital assistant (PDA) or other types of electronic devices collectively referred to as a client device 16. In some embodiments, portable, digital client devices 16 are used to interface a person between virtual and physical worlds. In arrangement 10, the client devices 16 contain a database that can hold a person's preferences and interests.

The database is stored in computer readable form within the device 16. The electronic world 14 offers information or services to the person. The device 16 includes an executable process 20 that associates these three realms in a useful

5   manner.

The wireless client device, e.g., a PDA 16a, is shown connected in a network comprised of servers 24, desktop PCs 26, networked appliances 31, wireless receiver servers 28, and smart telephones 30. That is, the electronic world 14

10   includes wireless and fixed servers 24, 26 and 28 on a network 29. The devices 16, if wireless, have a wireless transmission 27 to the receiver servers 28, which are connected to the Internet.

Each device 16, 24, 26, 28, etc. has shareable databases

15   36. Each device 16, 24, 26, and 28, either offers and/or requests services and information from others of the devices 16, 24, 26, and 28. Information capsules about each shared database are distributed across the network to client wired and wireless devices 16. A server 34 with a match process 32

20   is shown, although this process can be run in any of the aforementioned devices.

Devices 16 that are local to a person's physical location can communicate via close range bandwidths and protocols directly or over a local network in a peer to peer or client

25   server manner. Devices 16 that connect into a global network can use standard communications transmissions for such devices, e.g., Internet and wireless Internet protocols.

The physical location 17 of the client device 16 (or servers) can be part of the information that informs the

30   device or a matching process 32 on a matching server 34 what kind of services are provided or are relevant to the person. For example, the location of a wireless client maybe known as

part of the standard protocol for the device. Entities that comprise the physical environment such as stores, hospital, library and so forth have electronic presence also through servers 24 that exist in the virtual world 14.

Stores, machines and other people also have a physical location 17', as well as an electronic presence. In this scenario, the person's client device 16, via a communication process (described below), shares information about the person's interests and physical location, across the network 29. Instead of asking a particular source for an answer, the request for information is formed in a more general manner and matched to information offered over the network 29. The responses may take into account the person's physical location, time and context, and relate to items in both physical and electronic realms.

The client device 16 has a small screen 40 that displays topics of interest 41, a reply item of interest 42, with a small map 42b to get to the place shown 42a. For example, a restaurant whose physical location is at the same general location as the person also has a server 24 that sends information to the display 40 on the client device 16.

The personal information that is stored on the client device 16 is communicated to the host telecommunications device 28. The information can be stored in the client device 16 or could be stored on a private server and host machines could query the private server. A matching host 34 receives the communicated information. The matching host includes a matching process 32 that is coupled to the network 29.

Referring to FIG. 2, a process 70 of sharing information is shown. Information is shared by composing 72 matchable items such as offers or requests for information or services. An offer or request is packaged 74 with parameters used to

control distribution and privacy of the information as it is distributed among computers. The requests and offers are optionally stored 76 in personalized databases containing other topics. Each item within a collective can be

5   selectively activated for sharing based on time, location or other factors. Selected offers and requests are actively distributed 80 into the computing environment. This can be a local interaction between two local devices or via a network. The offers and requests are collected by a variety of machines

10   and compared 82 with information contained within these devices. A matching process 32 is conducted to match corresponding and/or complementary offers and requests. Responses 84 for matched offers and requests are sent to parties based on mutually compatible privacy and distribution

15   settings.

As a result of matching 82, a process can be used to refine 83 a query back to the client or host/server systems until there is a suitable match. For example, if asking for restaurants, a refinement process can include sending a

20   modified inquiry that requests information by subtype of restaurant to reduce the answer size.

Very private information can be handled via local sensing 78 instead of distribution. Once the information is matched and filled either locally or remotely an adequate response is

25   obtained 84. The response can be transmitted and include information, a service, or a referral. The response typically comes from the host. The response is queued and results are displayed on the client device 16. Items within the databases are focused, i.e., selected based on interests of the user

30   expressed in the received capsule. The selection process can be performed automatically through time and location settings for any item. A client device 16 can share focused items over

the network. General sharing of private interests can be done via trusted hosts that perform comparisons, as will be described below.

Referring to FIG. 3, content such as web pages, personal data, notes etc. are accumulated and edited to make up one's personalized content. For example, a person's database can have topics 41 such as art exhibitions 41a, lunch preferences 41b, travel plans 41c, social activities 41d, information on hobbies, etc. In this example, the selected or activated topic "lunch", expands to show collected information 42 on a matched restaurant name, such as telephone number, specials, address, directions, etc. Selecting the link to "reservations" can initiate a call to the restaurant using a voice connection, or a data message to make a reservation.

Matches for shared topics 41 are the result of content 44 that has shareable, matchable, and fillable elements. The topic "Lunch" 41b has contents 44 that are tabular 45 with attributes 45a and blank field values (i.e., slots) to fill 45b. In this example, the content setup record with attribute "Place" and blank value 45c, is matched and shown as "Place: Dan's Sea Grill". Similarly, the values for the attributes "Reservations" 45d, "Location" 45e, "Hours" 45f, and "Specials" 45g are filled in and shown in the match 42, with lines 45d', 45e', 45f', 45g' respectively.

A second example match 42' is shown with topic "Coffee for friends" 41d. Whereas the match displayed for "Lunch" 41b is tabular, with attributes and filled in values, the match shown for 42' is free form text 46, also with tagged values 46b filled in 46c.

Thus, referring back to FIG. 2, in this example, the topic "Lunch" gets packaged 74 and submitted into a store of other requests and offers. Within a matching process 32

offers and requests are collected. These offers and requests
may refer back to other material such as on web sites.
Whereas documents on web sites are primarily for reading by
people who visit and browse the site, the offers and requests
shown here are actively distributed 80 capsules that can be
collected by a variety of machines and compared within various
contexts. These offers and requests can come from servers
belonging to electronic businesses or physical businesses, or
from people who likewise send or request information to share.
Unlike E-mail or other forms of messages, these capsules do
not have to be directed to a specific audience or request a
particular resource or product. There may be no match
available at a time (t1) but a match could occur at a later
time (t2) within the capsule's life span. Requests and offers
shown may not be for information but for a service that can be
rendered or arranged electronically.

The device 16a determines how and whether information is
transmitted. The information is collected and personalized to
specify information and services to request or offer. An
offer or request is sent 80 in a peer-to-peer or client-server
environment. Some information based on personalization in the
client is sent from the device 16a to the matching server 34.
The information is matched with a variety of different
services from other hosts that are also sending information to
the server 34. The information sent by the servers can either
be in the physical area of the client or they can be services
that are generic services, which do not have a physical
presence in the physical location occupied 17 the client.

Referring to FIG. 4, a person, a store, restaurant,
museum, tourist bureau 24e, and e-business each have shareable
databases of information and services 36 stored in their PDA
16 and host computers 24a, 24b, 24c, 24d. The shareable data

is sent a host's 34 matching process 32 for comparison.

Referring to FIG. 5 a participating device e.g., 16 can include a sense process 90, an interpreter 92 and a relay process 94. The device can also include a response process 96 and a process that can provide an optional array of services 98 such as to connect on an online chat. The device 16 includes a matching engine 100 that conducts a matching process, a data store and retrieval module 102, and a module to automatically focus 104 items in the database based on context. Each device acts either as a host 32 to other devices without such functionality 33 or as a peer 32'.

TABLE 1.

	Entity	Transmittal type	Mode	On (topic)	Audience
1	Person	Requests	Information	Place to dine	Restaurant, tour guide, friends
2	Person	Requests	Activity	Meeting with co-worker	My company
3	Person	Requests	Information	Train schedule	Transit authority
4	Person	Requests	Connection	Conversation with friend	Friend
5	Person	Offers	Connection	Conversation with friend	Friend
6	Retail Store	Offers	Information	Products for sale	Person
7	Retail Store	Offers	Information	Hours open	Person
8	Retail Store	Offers	Information	Store location	person
9	Company	Offers	Information	Catalog of products	Person or company
10	Company	Offers	Information	Services available	Person or company
11	Company	Requests	Transaction	Purchase of products	Company
12	Museum	Offers	Information	Exhibitions	Person
13	Restaurant	Offers	Information	Menu	Person
14	Restaurant	Requests	Activity	reservation	Person or company
15	Restaurant	Offers	Information	Specials of the day	Person
16	Restaurant	Offers	Information	location	Person
17	Bank	Offers	Calculation	Mortgage rate	Person
18	Bank	Offers	Information	Accounts available	Person or company
19	Credit card company	Offers	Transaction	Credit purchase/sale	Person or company
20	Credit card company	Offers	Information	Promotional interest rate	Person
21	News organization	Offers	Information	Financial news	Person
22	News organization	Requests	Information	Survey question	Person

23	Hotel	Offers	Information	Rooms for the night	Person
24	Hotel	Requests	Activity	Room reservation	person
25	Transit authority	Offers	Information	Train schedules	anyone
26	Search engine	Offers	Information	Web page links	Person

5   Examples of shared topics are shown in TABLE 1. These topics are
descriptive example listings within shared databases 36 owned by people,
stores, companies, museums, restaurants, and other traditional 12a and
electronic entities 14. Each shared topic is a request or offer for
information or service, on a particular topic and for an audience. For
10   example, a person may request information on dining. In contrast, a person
may also request to meet with a co-worker. The first is a request for
information, the second example is a request for an activity to occur.
Requests and offers may be satisfied, i.e., matched with information and
services from sources that change with location or context. The
15   specification of audience, as will be described in detail later, is not
limited to a specific person, company or URL, but in general terms that can
be assigned during processing. In the present example, information on
dining may be filled by offers for information from restaurant guides,
newspapers, individual restaurants, and even personal sources such as
20   friends. The matches will depend on part on the narrowness or broadness of
the audience allowed. This is set by each shared element's owner and is
matched to a complementary element if found. In such a situation,
companies and other public entities may target their information and
services to a broad audience or a very specific audience – such as tourists
25   or shoppers, while individuals may target their shared elements in a manner
more selective and personal manner.   .
          Each shared offering or request, as exemplified in Table 1, is a
small expression that can persist over time and is collected and
disseminated electronically. As such, this data is an extension of a
30   person or organization into an electronic arena, to be inspected 90,
matched 100, stored 102 and relayed 94. Various participants will make
offerings and requests in varying degrees of privacy. For example, the
offering of a store sale is a public announcement meant to reach a broad
audience, while the interest of a potential customer is a private inquiry.
35   A potential customer may even want to be totally anonymous and 'window
shop'. Privacy in this system has many facets, including the privacy of
identity, of expressed interest, of transmission, information and

- 13-

processing. Methods for controlling the privacy during such a sharing ·
process will be described below.

TABLE 2.

1.0	Person	Requests	Activity	Dinner with friends	friends
1.1		Requests	Informatio n	Popular places to dine	Restaurant guide
1.2		Request s	Information	Cuisine preferences	friends
1.3		Request s	Activity	Reservation	Restaurant

Table 2 shows how individual shared elements can be
combined to make a more complex 'scenario'. For example, a
person's request for dinner with friends may break down to
requests for information about places to dine, types of
cuisine preferred, and reservations. These individual
requests (or offers) may be directed to different audiences
and have other different traits, but act as a unit.

As shown in Table 3, various types of requests and offers
for information and services are shown.

TABLE 3.

Mode \ Nature	Request to	Offer to
Information	Request to receive information such as on a topic or from a person or organization.	Offer to provide information on topics. Sites and search engines could provide this content.
Transact	Request to perform a transaction between 2 or more parties resulting in a contractual exchange.	Offer to perform a transaction between 2 or more parties, resulting in a contractual exchange.
Connect	Request to connect to a service.	Offer to connect to a service, such as a news channel, discussion, or activity.
Relay	Request to relay information across networks, to people, machines across gateways.	Offer to act as intermediary to relay information from one party to another.
Store	Request to have information stored.	Offer to provide storage of information.
Calculate	Request to have a calculation performed.	Offer to perform a calculation.
Other	Request for custom service.	Offer for custom service.

For example, a shared capsule can offer information on a topic with a request for information on a topic (request to receive or offer to send). A shared capsule can also request to perform a transaction or offer to perform a particular transaction - such as a credit card transaction. The shared capsule can also offer a request to connect to a person, or a discussion group or organization or offer to satisfy this connection. The shared capsule can also request to relay information or offer to perform the associated service. The shared capsule can also offer or request to have information (contained in the contents) stored, and offer or request for a calculation to be performed.

The arrangement 10 uses the shared capsule for sharing information and for matching requests and offers for information and/or services. The arrangement 10 breaks down these activities into small granular portions of information that can be acted on. Beyond sharing information, the arrangement 10 can be used to find an available computer to perform a calculation, or the best rate to finance a purchase and sale transaction, or a server to store information.

The wrapper 121 (collectively fields 123) can be read and used without access to the content 122. The content 122 can be encrypted separately from its wrapping to provide added security. Individual parts of the wrapper 121 can also be encrypted separately so that only particular audiences or hosts can use this information. The ownership can be specified via a handle, to provide anonymity to the owner except to a trusted provider. The resolution of the handle can be made known only the trusted provider.

The location information is useful for mobile purposes. The data structure capsule is also encapsulated in information that pertains to a transmission protocol e.g., TCP/IP, etc., used to transmit the capsule to servers or other devices.

Referring to FIG. 7, a data structure 122 that represents the shared capsule contents is shown with example data 122'. The type of contents is "XML" 122a. The tags to be matched are listed 122b. The place-marks for contents that are to be filled during a match are identified 122c. The tagged contents data is specified 122d.

Referring to FIG. 8, a data structure 124 that represents ownership is shown with example data 124'. The primary host specifies a host computer that represents the user. The ownership type field specifies whether the named owner is a name, an email address or a handle 124a. A handle is a name that masks the identity of the owner and is known by the primary host 124c. The data contained in the capsule is thereby disassociated with its actual owner via the handle. In the example, the identifier type is a handle. The identifier is a fictitious name known to resolve to an actual client's name by the specified primary host. A user's handle can be changed frequently and be resolved to its owner by its trusted hosts.

Referring to FIG. 9, a data structure 126 that represents location information is shown. The location information is useful for mobile client devices. The user's current location can be specified in a variety of ways, for example, by decreasing scale of country, state, city, neighborhood, and street fields 126b. The scope 126a is used to specify respondent location requirements. For example, only respondents with a physical location presence may be desired. Scope could also be within a micro area such as a room, or within an office building, a city, state, country or global bounds.

Referring to FIG. 10, within a client database, the life span data structure 128 is used to test for automatic activation and distribution. After distribution, the life span of the shared capsule specifies when the material is active or relevant. Thus, the life span data structure 128 includes fields 128a-128e that specify date created, expires, starts, ends, and repeat cycling respectively. The time frame can be a period of time within each day, for a range of days. Activities such as lunch or business activities would fit into such repeating time periods.

Referring to FIG. 11, the binding data structure 128 specifies the audience 130a to which the content information is directed. The audience field 130a can be very specific, such as one person, or general such as anyone from a company. The audience can further specify the hosts that can perform the matching process. The audience 130b can also be specified generally by topic. For example, the hierarchical topic "restaurants", and a sub topic "seafood." A topic or topic hierarchy can be specified from a particular source. The binding can also specify an audience not to allow binding to. The match process is expected to honor the audience

specification of each capsule. The binding data structure 130 also includes fields for match rules 130b. Match rules 130b can specify the quality of match that is acceptable, for individual aspects of the wrapper and the content. For example, location can require a precise match, preventing matches that are correct down to the city but not to the street level, for example. The matching server can be specified in priority, such as first in the local (user) device and then using a trusted host. This can control the security of the processing. The data structure 130 also includes a field 130c for rules on how material is to be filled. For example, only a summary of the contents may be filled and returned, or only a heading. A privacy setting field 130d can include a visibility setting, {IN, OUT, BOTH, IN+, OUT+} and an encryption setting. The contents and parts of the wrapper can be selectively encrypted to selectively protect its contents. A quick binding field 204e can include agreed to identifiers between known parties that can be used to signify that the item can be matched with minimal evaluation of other information. This can be specified to allow or deny matching with a particular audience with a particular id without evaluation of other aspects of the capsule.

Referring to FIG. 12, the transmittal detailed information data structure 134 has a mode field 134 that identifies the shared data package as either a request or an offer. It further has a field 134b that designates whether the mode is a request or an offer to receive, send, connect, run, transact, relay or store or calculate. The nature field is open to future modes via 'Other'. The transmittal info further identifies the package via an identifier field 134c. The identifier can include a thread id to track a sequence

-19-

within a set of information exchanges. A title field 206d describes the request/offer.

Referring to FIG. 13, the setup of the shared capsule data structure 120 is shown as a series of screens suitable for a small computing device 50. The major setup components of the listed 51 for a particular topic 41. Some setup items are general to the person while others are specific to a topic. The content setup 44 is shown here and described earlier in FIG. 4. The setup for owner 52, transmittal details 53, binding 54, location 55, life span 56 and respond 57 are shown as small device screens.

Referring to FIG. 14A, an example 120' of a plain text representation of a shared capsule data structure 120 is shown. The capsule begins with a transmittal specification 134'. The capsule includes life span 128' and location fields 126'. The capsule also includes binding 130' and content 122' fields. In this example, the capsule 120' is an offer to send information. As such, parameters in the binding field are set to reach as wide an audience as possible, via the "Allow bind all." Furthermore, the visibility setting, as will be described in detail later, is set to "Notify OUT+." This visibility setting enables offering information outward with the option to receive notices back of matches. The binding further allows all hosts to be used for matching, and allows this information to be relayed to other hosts. The topic binding specifies sets of hierarchical topics that this information can fall under. For example, the information can be included under "restaurant" and also under "banquets". The content information 122' shown is specified as a "Fragment" as described below. The data specifies in a concise notation, "Royal Panda" as an instance of a Chinese restaurant with attributes such as the specialties and links to reservation

information. This content could as well be represented in a
tagged format such as HTML or XML, as shown in FIG. 14B.

Referring to FIG. 15, the match process 160 proceeds to
evaluate the wrappers and process the contents of received
capsules. Under some circumstances, quick binding, as
described earlier in Fig.11 204e, can allow skipping the
individual matching process 160a, life span 160c, transmittal
160d, binding 160e, and audience 160f. Each match process
160a-160f can have its own settings for using or not using
particular aspects of the wrapper 101. If the evaluation of
the wrapper produces an adequate match, then the contents can
be examined. The content matching 160g may require subsequent
interactions 160h to refine the content. If there is material
to supply and fill 160i, then filling is performed. Filling
of missing information can be requested depending on the type
of request.

Referring to FIG. 16, a process 240 to match content is
shown. Different types of offers and requests are matched and
processed accordingly. The content matching process 240
determines 242 content type and obtains 244 match and fills
methods based on content type. Thus, as shown, an information
offer/request matches 246 content for request to receive
information with an offer to supply information. Similarly, a
transaction offer/request matches 248 requests for
transactions with an offer to process transactions. Other
processes 250-256 for connection, relay, store, calculate, and
so forth can be provided. Offers of information are only
relevant to requests for information, for example. The
process of matching requests and offers for information are
elaborated below. Custom specified offers and requests for
information and services can be specified beyond the ones
shown.

Referring to FIG. 17, matching a request and offer to provide information 246 proceeds dependent on the type of content. The process 246 determines 246a the type of content and retrieves 246b corresponding match and fill methods. The

5   process will have different actions depending on the type of content. For tagged content 247, such as HTML or XML, the process includes matching term usage 247a, the tag structure 247b and the tagged contents 247c. This does not have to be as strict as an XML DTD (extended markup language data type

10   definition) validation, in order to return a match. The process determines or identifies 247d requested slotted areas to fill.

For tabular content 249, the process compares 249a the database schema of the content. Since schemas from different

15   sources may be problematic, a flexible comparison of tables, fields, and relationships may enable a mapping 249b in order to satisfy some requests. The process will run 249c a query based on the mapped schemas.

The content can also take the form of a fragment database

20   251, as described below. Such a database defines information as fragmented objects, in terms of classifications, instance names, attributes, values, actions, conditions and containers. The process 246 then evaluates 253 if the representation is suited for sharing and matching information.

25   Referring to FIG. 18, for content represented as a fragment database, the content matching 251 proceeds by reading 251a match rules, standardizing 251b terms and comparing primitives 251c. Comparing primitives 251c includes matching classification sequences, matching named items,

30   matching memberships, i.e., parts and subparts, matching roles between objects, and matching activities. The general properties belonging to a classification and particular

properties belong to an instance can be matched.

Referring to FIG. 19, a set 270 of visibility methods are shown. TABLE 4 depicts for one embodiment allowable matches of visibility methods. In TABLE 4, "YES" entries are allowable matches, whereas "NO" entries are prohibited matches. By conforming to this visibility protocol, parties can share information and services with user-selected visibility.

TABLE 4

Internal \ External	IN	IN+	OUT	OUT+	BOTH
IN	NO	NO	YES	YES	NO
IN+	NO	NO	YES	YES	YES
OUT	YES	YES	NO	NO	NO
OUT+	YES	YES	NO	NO	YES
BOTH	NO	YES	NO	YES	YES

As shown in FIG. 19, selecting a visibility method includes determining 272 what visibility method type to send and setting that visibility value in the visibility field of a capsule to be sent. A person who wants to 'window shop' wants to receive information 274. If such a person wants to be seen, the Notify IN+ setting is enabled 274b. Otherwise the Notify IN setting is enabled 274c, which indicates that the person does not want to be seen, i.e., identity or presence being made known to a responder.

A store that wants to offer goods and services 276 to as broad an audience as possible, would set 276b the visibility method as "NOTIFY OUT." A store that wanted to know who would like to know information about visitors would set 276c NOTIFY OUT+, to receive information if available. If a store or person desired a mutual exchange of information 278, a sent capsule would have the more restricting NOTIFY BOTH visibility

method set 278a. This method would require an exchange of
information.

The visibility setting for each shared data package can
be determined by its intended purpose. If the purpose is to
receive information and services, then the visibility is to be
directed IN-ward. If outside visibility is not permitted
while receiving information, then the visibility is set to
"IN." If outside visibility is needed in order to receive
information, then Visibility is set to "IN+."

If the purpose is to offer information and services, then
the visibility is to be directed OUT-ward. If no information
needs to be returned, i.e., the audience who receives such
information is not identified, then visibility is set to
"OUT." If identification of audience is desired if allowed,
then visibility is set to "OUT+." If an exchange is desired
between multiple parties with equal visibility, then
visibility is set to "BOTH."

Referring to FIG. 20, a client device 16 has a shared
database 36 containing a capsule 120 with content 122 and
transmittal parameters 123. Some of this information is
selectively encrypted such as the contents 122. This capsule
is distributed 80 to a primary host computer 24a. The primary
host computer knows the identity of the client device 16 user
as "dan" and changes it to a handle 124c "happyfrog" before
disseminating the information. From then on, the capsule's
owner is shielded. The data is disseminated and collected 82
by other host computers for comparison and matching. Within a
matching server 34 there is a matching process 32 that is
trusted, i.e., performs matches without allowing inspection of
processing or results from outside the process 32. In this
example, the information from device 16 is matched with
another device 24b. A successful match is responded to 84

-24-

back to the device 16, but not to the other user 24b in this example, based on visibility rules as described in FIG. 22 and Table 4., as would be the case for a visibility flag of IN.

Other embodiments are within the scope of the following

5   claims.